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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/476,558	01/03/2000	Yongjun Hu	11675.130.1	8004

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EXAMINER

LOUIE, WAI SING

ART UNIT PAPER NUMBER

2814

DATE MAILED: 03/27/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/476,558

Applicant(s)

HU, YONGJUN

Examiner

Wai-Sing Louie

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 January 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 16-44 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 16-44 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 346
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 16, 18, and 43-44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brady et al. (US 5,066,615).

With regard to claims 16, 18, and 43-44, Brady et al. disclose a semiconductor structure (col. 2, line 39 to col. 6, line 65 and fig. 1) comprising:

- A semiconductor substrate 11;
- An ARC 21 over the semiconductor substrate comprises a metal silicon nitride (col. 3, line 24), and the metal is selected from the group consisting of Ti, Zr, Mo, Ta, and W (col. 3, lines 23-27). When deep ultraviolet (DUV) light is applied, it is obvious to adjust the composition of the ARC compound for DUV (table I and col. 4, lines 16-24).
- An ARC 21 having a thickness range from 125 and 750 Å (col. 4, lines 58-59).

Claims 17, 19, 26, 32-36, and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brady et al. (US 5,066,615) in view of Fan et al. (US 5,116,427).

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With regard to claims 17, 19, and 41, Brady et al. disclose the metal silicon nitride (MSiN) used for ARC compound (col. 3, line 24), but do not disclose the metal is selected from the group consisting of titanium-tungsten. However, Fan et al. disclose that this layer can be any number of the refractory metals, such as titanium-tungsten, have suitable antireflective characteristic (Fan col. 2, lines 34-35 and lines 63-67). Fan et al. teaches the refractory metals can operate at very high temperature and it can be utilize as a barrier to prevent diffusion of metal to other semiconductor layers (Fan col. 2, lines 60-63). Hence, it would have been obvious to one with ordinary skill in the art to provide TiWSiN instead of WSiN used in Brady's device as a design alternative.

With regard to claims 26 and 32-36, please see the description of record.

Claims 20-25, 27-31, and 37-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brady et al. (US 5,066,615) in view of Niroomand et al. (US 5,886,391). Please see the description of record.

Objected Claim

Claim 42 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

Applicant's arguments filed 1/17/02 have been fully considered but they are not persuasive.

- Applicant has amended the claims to include DUV applying to the ARC. The claim rejections have been modified to address the new issue. Please see the rejections above.
- Applicant argues the reference Fan et al. (US 5,116,427) do not address the newly amended TiWSiN ARC compound in claim 17. However, Fan et al. provide the teaching of using titanium-tungsten as M1 and M2 metal group and reference Brady et al. (US 5,066,615) provide the use of single metal silicon nitride ARC compound. The combination shows the claimed features.
- Applicant argues that Fan et al. do not teach or suggest the use of binary metal compound. However, Fan et al. disclose the compound in col. 2, line 65, col. 5, line 6, and col. 5, line 20 (tungsten alloys).
- Applicant argues that reference Niroomand et al. do not recite the new issue of "configured to minimize reflectivity of DUV". However, Brady et al. have addressed the DUV issue in claim 16 and Niroomand et al. address the polysilicon layer's rough or hemispherical grained feature. The combination is proper and shows the claimed features.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Wai-Sing Louie whose telephone number is (703) 305-0474.

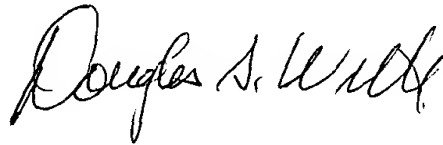
The examiner can normally be reached on 7:30 AM to 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on (703) 306-2794. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

ws1

March 24, 2002



Douglas A. Wille
Patent Examiner